Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

for

The influence of hydrogen bonding on the structure of organic-inorganic hybrid catalysts and its application in the solvent-free epoxidation of α-olefins

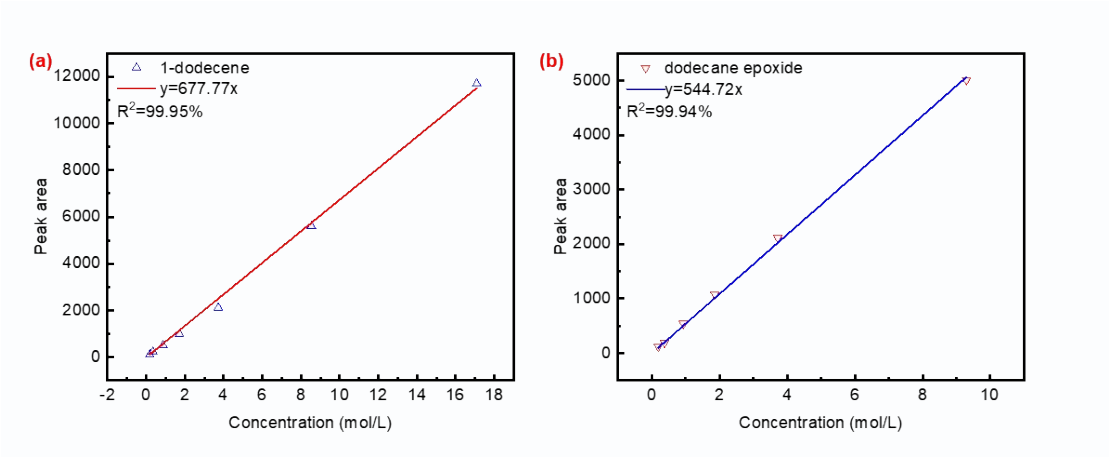
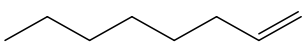
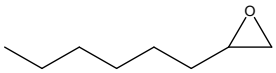
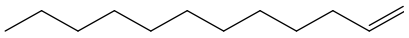
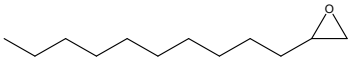
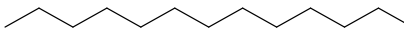
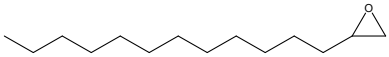
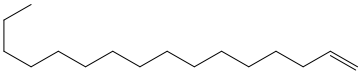
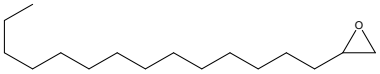


Fig.S1. Curves of standard samples by Gas chromatographic, (a) 1-dodecene, (b) dodecane epoxide

Table S1. Catalytic reaction of different olefins

Substrate	Product	Selectivity/%	Conversion/%
		80.8	26.2
		90.5	29.8
		93.4	35.8
		92.1	28

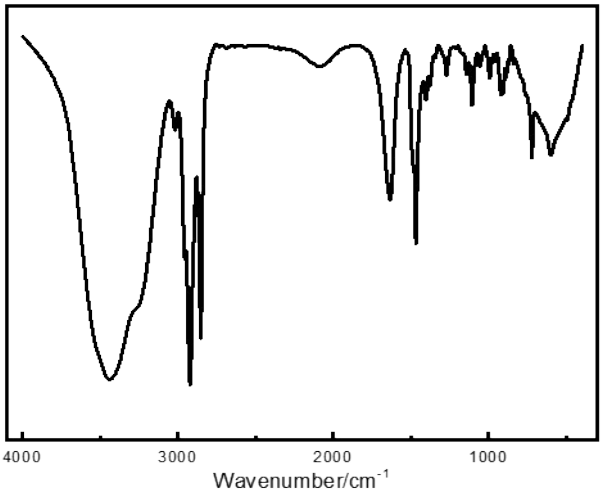


Fig.S2. FT-IR spectra of DDC; 3437 cm^{-1} (O-H stretching vibration), 2921 cm^{-1} (C-H asymmetrical stretching vibration), 2853cm^{-1}(C-H stretching vibration), 1469cm^{-1}(C-N stretching vibration), 1403 cm^{-1} (-CH_2- bending vibration)

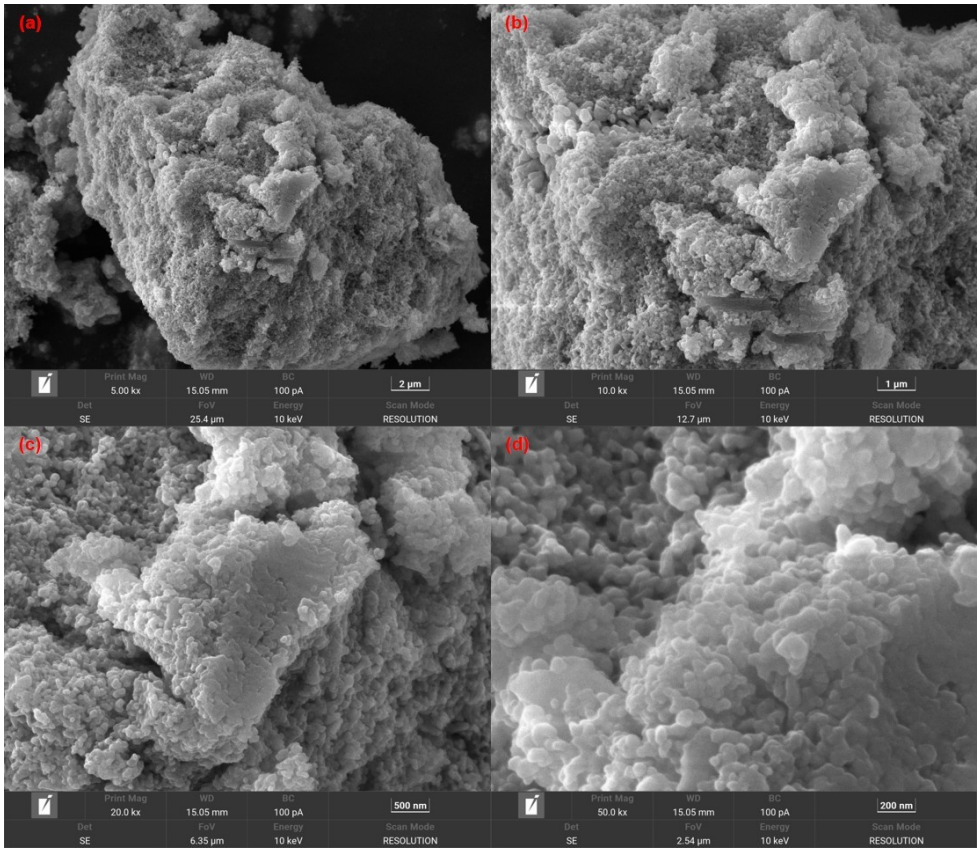


Fig.S3. The SEM of P_2W_{18}-DDC (a) 2µm, (b) 1µm, (c) 500nm, (d) 200nm

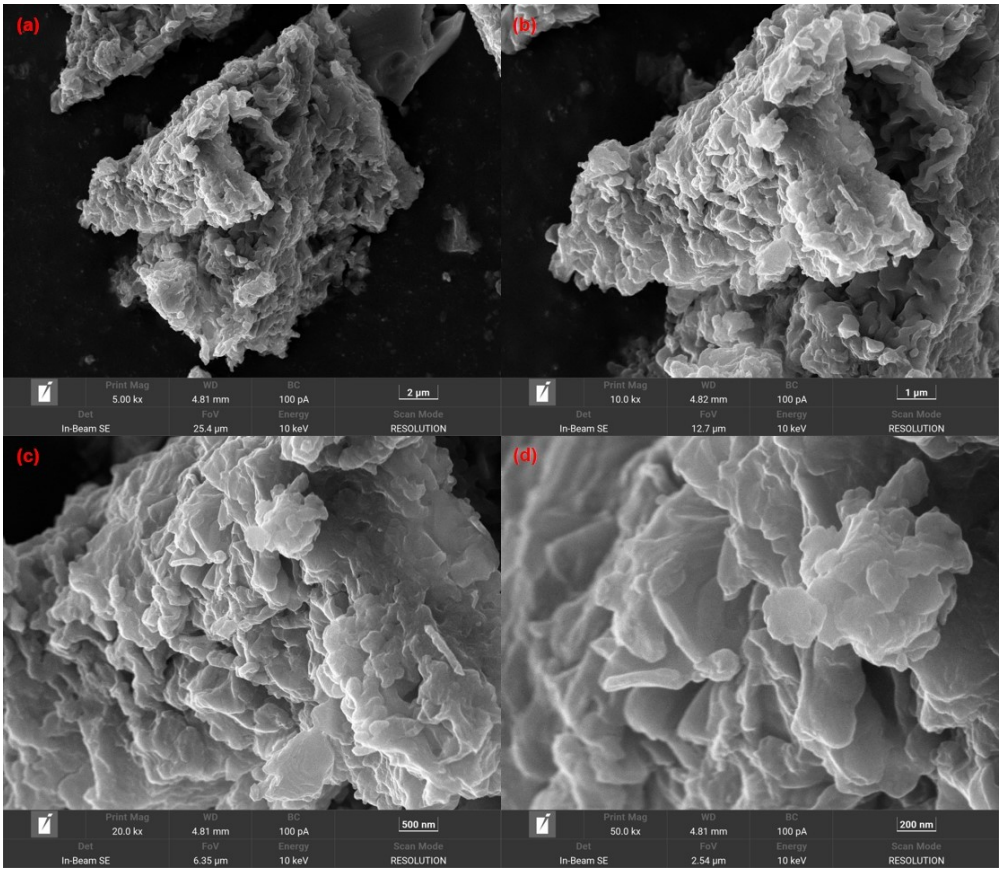


Fig.S4. The SEM of PW_{12}-DDC (a) 2µm, (b) 1µm, (c) 500nm, (d) 200nm

Table.S2. Molar ratio of P:N and P:W in two catalysts

	P:N	P:W
P_2W_{18}-DDC	4:9	2:11
P_2W_{18}-DDC (In theory)	1:3	1:3
PW_{12}-DDC	1:8	1:10
PW_{12}-DDC (In theory)	2:3	1:4

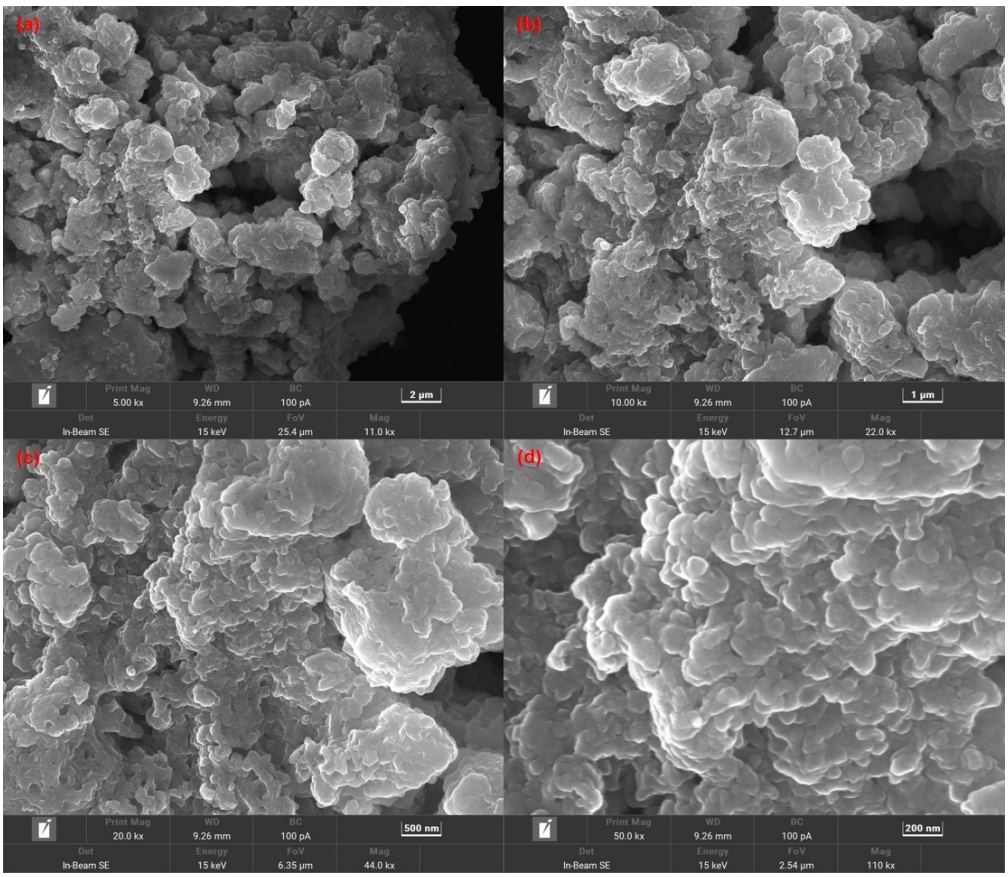


Fig.S5. The SEM of used P_2W_{18}-DDC (unwashed) (a) 2µm, (b) 1µm, (c) 500nm, (d) 200nm

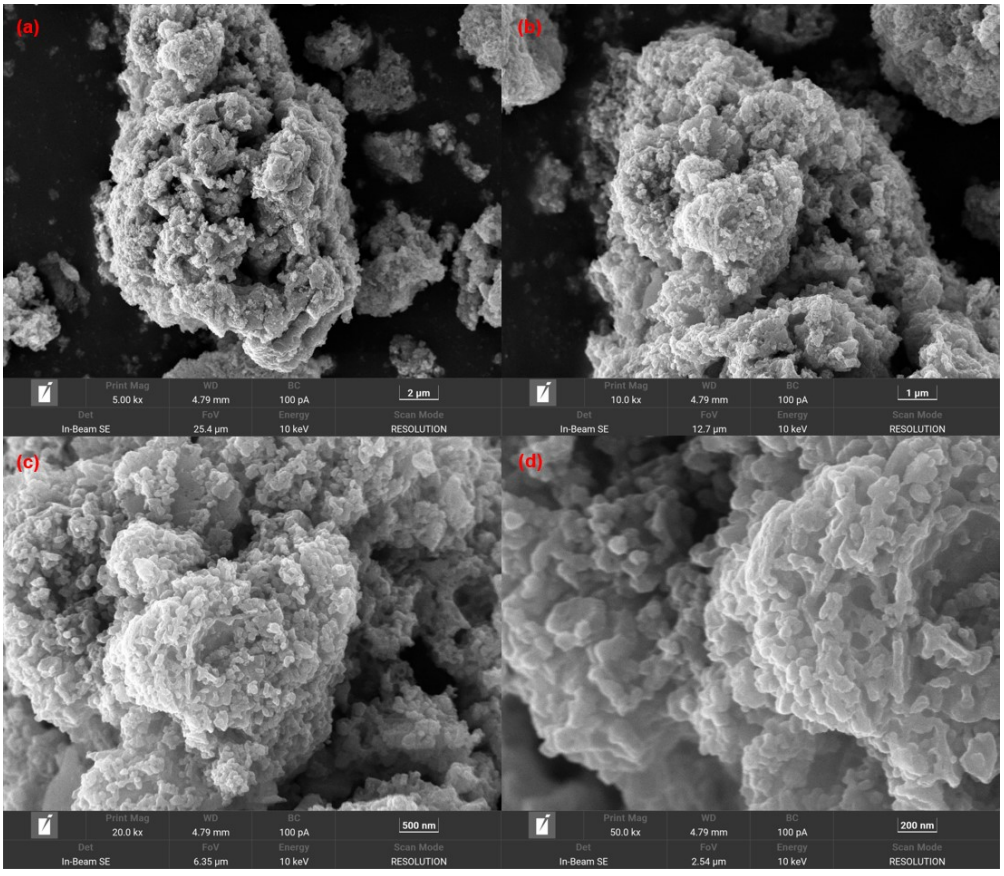


Fig.S6. The SEM of used P_2W_{18}-DDC (washed) (a) 2µm, (b) 1µm, (c) 500nm, (d) 200nm

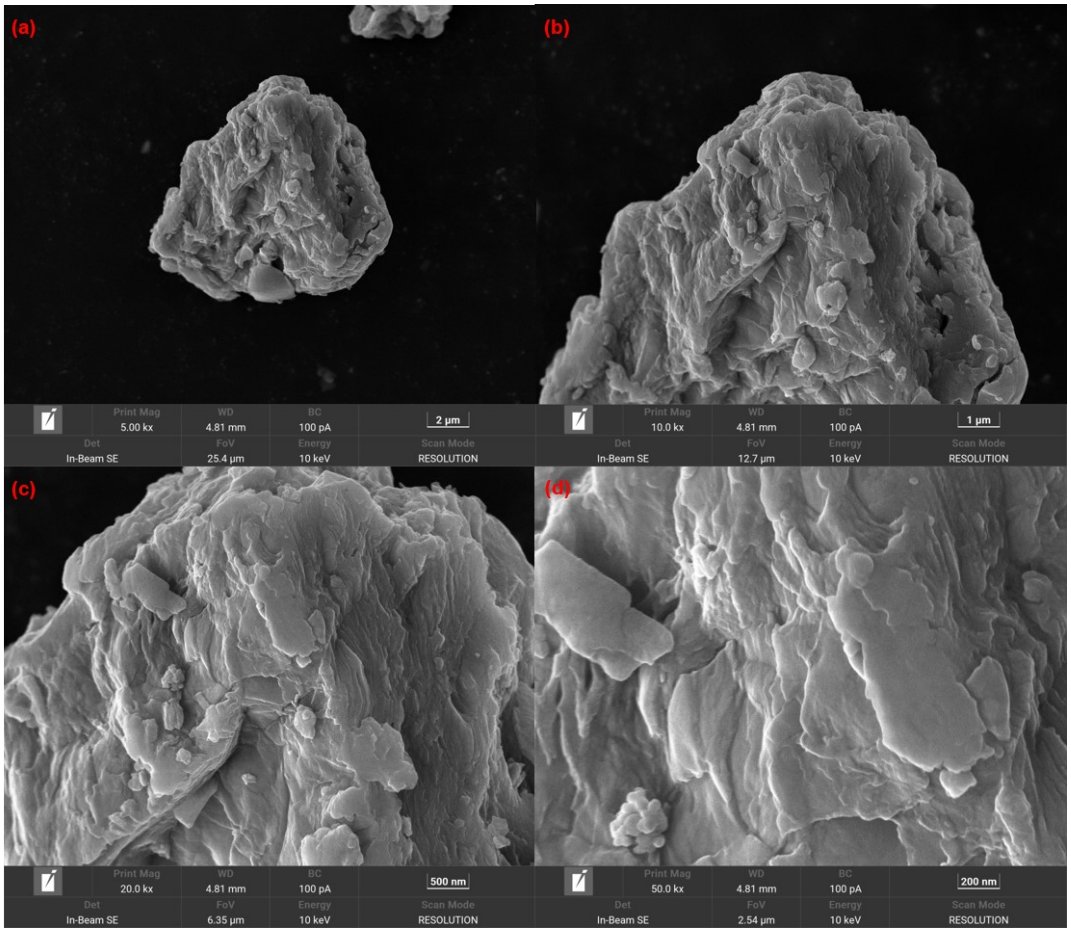


Fig.S7. The SEM of used PW12-DDC (washed) (a) 2µm, (b) 1µm, (c) 500nm, (d) 200nm

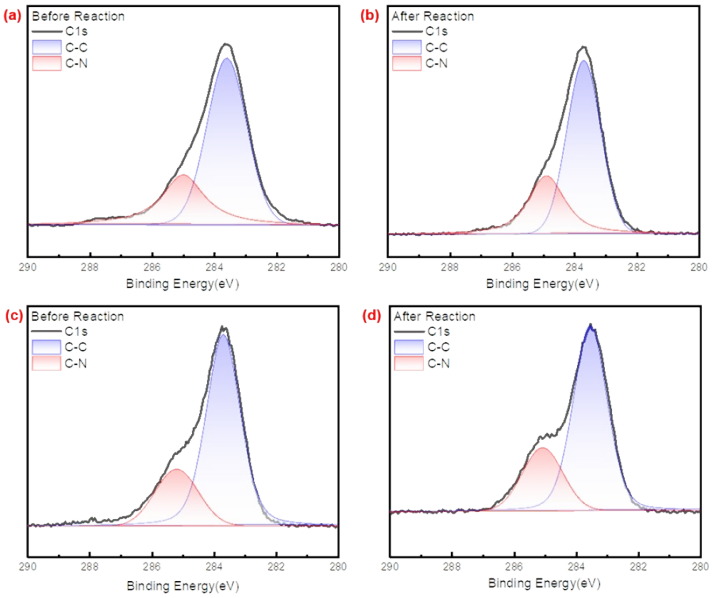


Fig.S8. (a) the C1s XPS spectra of PW_{12}-DDC, (b) the C1s XPS spectra of used PW_{12}-DDC, (c) the C1s XPS spectra of P_2W_{18}-DDC, (d) the C1s XPS spectra of used P_2W_{18}-DDC

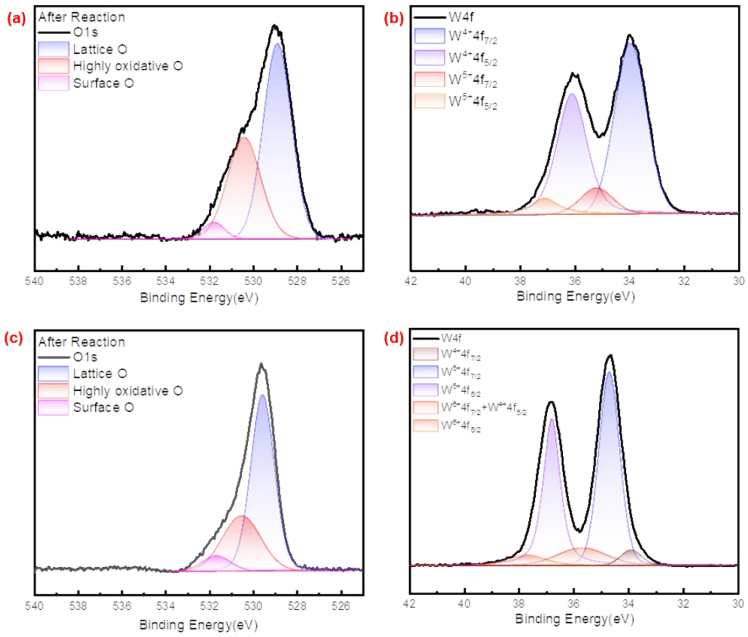


Fig.S9. (a) the O1s XPS spectra of used PW_{12}-DDC, (b) the W4f XPS spectra of used PW_{12}-DDC, (c) the O1s XPS spectra of used P_2W_{18}-DDC, (d) the W4f XPS spectra of used P_2W_{18}-DDC

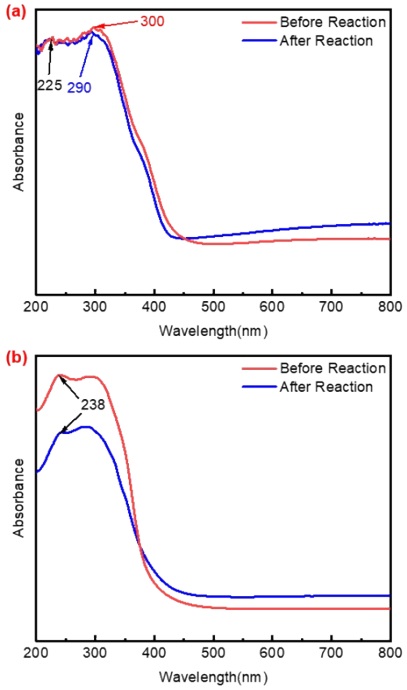


Fig.S10. (a) UV-Vis spectra of P_2W_{18}-DDC, (b) UV-Vis spectra of PW_{12}-DDC

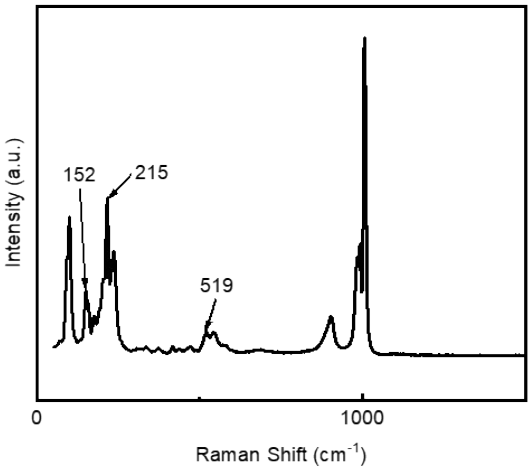


Fig.S11. Raman spectra of $H_3PW_{12}O_{40}$